29th — 30th August 2019 | Glasgow, UK

www.asranet.co.uk

# 4th International Conference on Offshore Renewable Energy CORE 2019

## Preliminary Programme

## About the Conference

**Running for the forth time, CORE 2019 is the only technical conference on offshore renewable energy in Scotland, a fitting location, considering that is where most of the UK's offshore wind energy recourses are concentrated.**

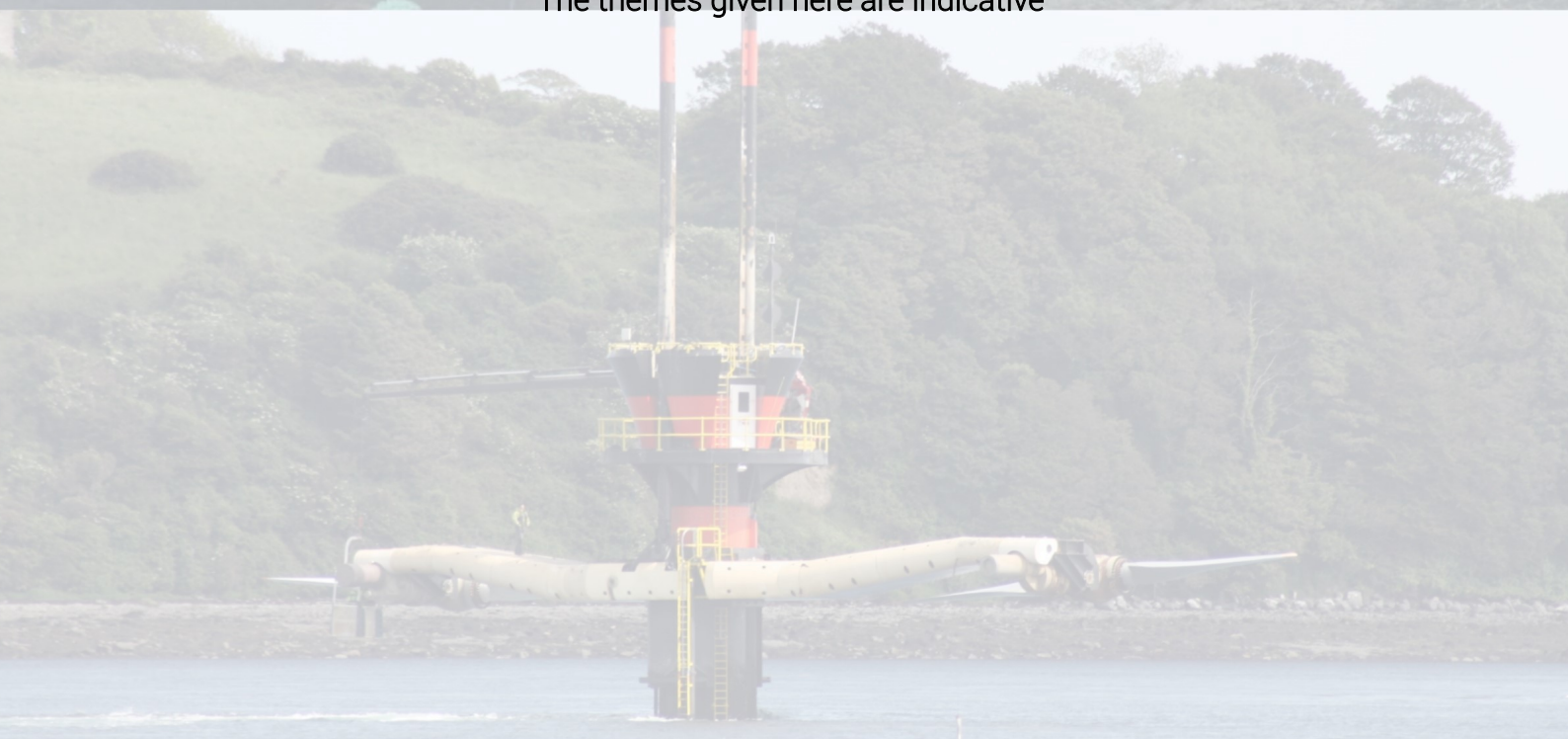
This conference will offer delegates an unparalleled opportunity to network with researchers, technology developers, industrial players, and supply chain partners. It will address the latest developments and strategies in offshore renewable energy, potential investors from public funds and government support funding, wave and tidal energy resources.

One of the aims of this conference is to create a framework for knowledge sharing and to develop a roadmap for research activities in the context of offshore renewable energy that are a relatively new and challenging field of interest. In particular, the conference will enable research activities leading towards innovative, cost efficient and environmentally benign offshore renewable energy conversion platforms for wind and wave energy resources.

## Conference Themes

- Wave and tidal energy resource
- Offshore wind Power
- Technological developments
- Mitigating risk on the road to commercialisation
- Monitoring, operation and maintenance of wind farms
- Technology management assessment of marine renewable energy
- Developing a commercial scale tidal energy array
- Latest Development of large-scale Offshore Wind Turbine
- Device development and testing – tidal
- Developing a viable ocean energy supply chain
- Rules, regulations and recent policy developments
- Innovation and Recent Projects in the
- Offshore Renewable Energy sector

The themes given here are indicative



## Registration Fees

| | |
|---|---|
| **Full Registration:** | £400 |
| **Student Registration:** | £200 |

## Organising Committee

**Professor Purnendu Das**
*ASRANet Ltd, UK*

## Technical Advisory Panel

**Dr Mahmood Shafee** Cranfield University, UK

**Dr Sasa Djokic** University of Edinburgh UK

**Dr Wenxian Yang** Newcastle University UK

**Prof Zhen Gao** NTNU Norway

**Dr R V Ahilan** LOC Group Ltd UK

**Mr Peter Jamieson**, University of Strathclyde, UK

**Dr Madjid Karimirad** Queens University Belfast

**Dr Jimmy Murphy,** University of Cork, UCC, Ireland

**Mr Ben Smith**, ATKINS Global UK

**Dr Vikram Pakrashi,** University of Dublin UCD, Ireland

**Prof Reinhard Madlener,** RWTH AACHEN University, Germany

**Mr René Lindeboom,** MARIN, Netherlands

**Dr Stuart Bradley,** Catapult, UK

**Dr Rajesh Katyal,** NIWE, India

**Prof Nilanjan Saha,** IITM, India

**Dr Musa Bashir,** Liverpool John Moores University, UK

## Keynote Speakers

**Mr Andrew Jamieson,** Catapult Offshore Renewable Energy, UK

**Prof Stephen Salter,** Edinburgh University , UK

**Prof Lars Johanning,** University of Exeter, UK

**Dr Sasa Djokic,** University of Edinburgh, UK

## Invited Speakers

**Dr Domenico Lombardi,** University of Manchester, UK

**Dr Peter Clive,** Wood, UK

**Dr Vesna Jaksic,** Cork Institute of Technology, Ireland

**Mr Karl Mitchell,** Atkins Global, UK

**Dr Fuat Kara,** Sheffield Hallam University, UK

**Prof Reinhard Madlener,** RWTH AACHEN University, Germany

**Dr Musa Bashir,** Liverpool John Moore University, UK

**Dr Mahmood Shafiee,** Cranfield University, UK

**Dr Wenxian Yang,** Newcastle University, UK

**Dr M. Sergio Campobasso,** Lancaster University, UK

**Dr Stuart Bradley,** Catapult, UK

**Dr Tim Camp,** LOC, UK

**Dr Antonio Sarmento,** Instituto Sperior Technico, Portugal

**Mr Peter Jamieson**, University of Strathclyde, UK

# Day 1—29th August 2019

| | |
|---|---|
| 8:30-8:55 | DELEGATE REGISTRATION |
| 8:55-9:00 | **WELCOME ADDRESS:** PURNENDU DAS, ASRANET LTD, UK |
| | **CHAIR:** PURNENDU DAS & FRANK ADAM |
| 9:00-9:40 | **KEYNOTE PAPER:** THE IMPORTANCE OF UNDERSTANDING FLOW IMPEDANCE FOR THE DESIGN OF TIDAL STREAM PLANT. |
| | **STEPHEN SALTER**, EDINBURGH UNIVERSITY , UK |
| 9:40-10:20 | **KEYNOTE PAPER:** OPTIMIZATION APPROACHES FOR OFFSHORE RENEWABLE ENERGY APPLICATIONS |
| | **LARS JOHANNING,** UNIVERSITY OF EXETER, UK |
| 10:20-10:50 | BREAK |
| 10:50-11:10 | **INVITED PAPER:** THE BENEFITS OF AN UPDATED INTERNATIONAL STANDARD FOR THE DESIGN OF FUTURE OFFSHORE WIND TURBINES AND THEIR SUPPORT STRUCTURES |
| | **TIM CAMP,** LONDON OFFSHORE CONSULTANTS, UK |
| 11:10-11:30 | **INVITED PAPER:** TRANSPORTATION FATIGUE DAMAGES FOR VERTICAL SEA-TRANSPORTATION OF WTG JACKET SUB-STRUCTURES |
| | **RUSHIKESH SAPDHARE,** ATKINS, UK |
| 11:30-11:50 | **INVITED PAPER:** THE DECARBONISATION OF GLOBAL SHIPPING |
| | **PETER CLIVE,** BLACK AND VEITCH, UK |
| 11:50-12:10 | **INVITED PAPER:** GOING INTO DEEP WATER: THE ANSWER IS…… |
| | **VESNA JAKSIC,** CORK INSTITUTE OF TECHNOLOGY, IRELAND |
| 12:10-12:30 | INVITED PAPER: THE WINDS OF CHANGE: THE CHALLENGES AND OPPORTUNITIES FOR FLOATING WIND IN A DECARBONISING ECONOMY |
| | **KARL MITCHELL**, ATKINS GLOBAL, UK |
| 12:30-14:00 | LUNCH |
| | **CHAIR:** BEN SMITH & MARKUS MULLER |
| 14:00-14:20 | **INVITED PAPER:** INTERRELATEDNESS AND DIFFUSION DYNAMICS OF OFFSHORE RENEWABLE ENERGY TECHNOLOGIES |
| | **REINHARD MADLENER,** RWTH AACHEN UNIVERSITY, GERMANY |
| 14:20-14:40 | **INVITED PAPER:** O&M OF FLOATING WIND FARM—THE DEVELOPMENT OF A FLOATING WORKSHOP AND LIVING PLATFORM |
| | **FRANK ADAM,** UNIVERSITY OF ROSTOCK, GERMANY |
| 14:40-15:00 | **INVITED PAPER:** RESEARCH ON A COST-EFFECTIVE MEASURE FOR ENABLING SAFE TRANSFER OF OFFSHORE WIND FARM SERVICE VESSELS |
| | **WENXIAN YANG,** NEWCASTLE UNIVERSITY, UK |
| 15:00-15:30 | BREAK |
| 15:30-15:50 | **INVITED PAPER:** METHODOLOGY FOR THE STRUCTURAL HEALTH MONITORING OF FLOATING OFFSHORE WIND FARM |
| | **MUSA BASHIR,** LIVERPOOL JOHN MOORE UNIVERSITY, UK |
| 15:50-16:10 | **INVITED PAPER:** HOW CAN COMPUTATIONAL FLUID DYNAMICS BOOST THE DEVELOPMENT OF OFFSHORE RENEWABLE ENERGY? |
| | **M. SERGIO CAMPOBASSO,** LANCASTER UNIVERSITY, UK |
| 19:00 | CONFERENCE DINNER |

# Day 2—30th August 2019

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|---|---|
| | **CHAIR:** REINHARD MADLENER & WENXIAN YANG |
| 9:00-9:40 | **KEYNOTE PAPER:** INTEGRATING ACADEMIC RESEARCH WITH INDUSTRIAL NEEDS IN OFFSHORE RENEWABLE ENERGY |
| | **ANDREW JAMIESON,** CATAPULT OFFSHORE RENEWABLE ENERGY, UK |
| 9:40-10:20 | **KEYNOTE PAPER:** ASSESSING OPERATIONAL PERFORMANCE AND UNCERTAINTIES IN OFFSHORE WIND FARM POWER OUTPUTS |
| | **SASA DJOKIC,** UNIVERSITY OF EDINBURGH, UK |
| 10:20-10:50 | BREAK |
| 10:50-11:10 | **INVITED PAPER:** WHY IS WAVE ENERGY TECHNOLOGY TAKING SO LONG TO DEVELOP? |
| | **ANTONIO SARMENTO,** WAVEC OFFSHORE RENEWABLES , PORTUGAL |
| 11:10-11:30 | **INVITED PAPER:** ADVANCES IN ELECTRICAL MACHINES AND DRIVES |
| | **STUART BRADLEY**, CATAPULT, UK |
| 11:30-11:50 | **INVITED PAPER:** INNOVATIONS FROM EQUATIONS |
| | **PETER JAMIESON,** UNIVERSITY OF STRATHCLYDE, UK |
| 11:50-12:10 | OFFSHORE RENEWABLE ENERGY CATAPULT – ROBOTICS & ARTIFICIAL INTELLIGENCE |
| | **S. CHEESEMAN**, OFFSHORE RENEWABLE ENERGY CATAPULT, UK |
| 12:10-12:30 | COST REDUCTIONS THROUGH SMART TRANSPORTATION AND INSTALLATION ENGINEERING - EXPERIENCE OF THE MEYGEN TIDAL ARRAY. |
| | **D. BAXLAND**, SIMEC ATLANTIS ENERGY, UK |
| | **F. JOHNSON,**SIMEC ATLANTIS ENERGY, UK |
| | **DM. MACFARLANE**, APOLLO, UK |
| | **N. ROBINSON,** APOLLO, UK |
| 12:30-13:30 | LUNCH |
| | **CHAIR**: STUART BRADLEY & N. ROBINSON |
| 13:30-13:50 | METHODS TO ASSESS THE UNCERTAINTIES IN HARMONIC ANALYSIS OF TIDAL STREAM DATA |
| | **R. CLAYTON, P. TIPLER,** XODUS GROUP UK |
| | **H.SMITH,** UNIVERSITY OF EXETER, UK |
| 13:50-14:10 | EQUIVALENT POWER CURVES AND SHORT-TERM FORECASTING OF POWER OUTPUTS OF AN OFF-SHORE WIND FARM BASED ON A MULTI-STATE OPERATIONAL MODEL |
| | **MINGZHE ZOU, DUO FANG, SASA Z. DJOKIC ,**UNIVERSITY OF EDINBURGH, UK |
| | **SAM HAWKINS**, VATTENFALL AB, EDINBURGH, UK |
| 14:10 - 14:30 | THE DROP KEEL CONCEPT: A SEMI-SUBMERSIBLE-SPAR FOUNDATION ADPATED FOR EASE OF ASSEMBLY ` FOR THE FLOATING OFFSHORE WIND TURBINE MARKET |
| | **GARY ROSS, SANDY DAY, AND SAISHUAI DAI** FLOATING ENERGY SYSTEMS,UK |
| 14:30-14:50 | A REVIEW OF FLOATING PHOTOVOLTAIC DESIGN CONCEPTS AND INSTALLED VARIATIONS. |
| | **DALLAN FRIEL, MADJID KARIMIRAD, TREVOR WHITTAKER, JOHN DORAN,** QUEENS UNIVERSITY BELFAST, IRELAND |
| 14:50-15:10 | ADVANCED FIBRE-REINFORCED COMPOSITE DESIGNS FOR A PASSIVELY MORPHING TIDAL TURBINE BLADE |
| | **JAMES MCGUIRE, D. MAMALIS, E. D. MCCARTHY,** UNIVERSITY OF EDINBURGH, UK |
| 15:10-15:30 | BREAK |
| 15:30-15:50 | FATIGUE ANALYSIS ON YAW BEARING OF WIND TURBINE TO TURBULENT WIND |
| | **JIANWEN XU, SIMON BENSON, BEN WETENHALL**, NEWCASTLE UNIVERSITY, UK |

# Day 2—30th August 2019

15:50—16:10 C-GEN NEPTUNE, A DIRECT DRIVE GENERATOR FOR OFFSHORE RENEWABLE ENERGY CONVERTERS

**MARKUS MULLER,** EDINBURGH UNIVERSITY, UK

16:10—16:30 NUMERICAL ANALYSIS OF VORTEX-INDUCED VIBRATIONS ON EVOLVED SPAR-TYPE OFFSHORE WIND TURBINE IN DIFFERENT OCEAN CONDITIONS

**JOSHUA CUTLER, MUSA BASHIR, SEAN LOUGHNEY, MILAD ARMIN, JIN WANG,** LJMU, UK

16:30-16:50 WIND VARIABILITY AND POWER CAPACITY ASSESSMENT FOR THE FIRST OFFSHORE WIND FARM PROJECT IN INDIA

**RAJESH KATYAL, B. KRISHNAN , TAMADA SANKARA RAO,** NATIONAL INSTITUTE OF WIND ENERGY, INDIA

# ABOUT KEYNOTE SPEAKERS

## Mr Andrew Jamieson, Catapult Offshore Renewable Energy, UK

Integrating Academic Research with Industrial Needs in Offshore Renewable Energy

Andrew is Chief Executive of the Offshore Renewable Energy Catapult, a technology and innovation centre supporting businesses to accelerate the design, deployment and commercialisation of renewable energy technology. The Catapult provides deep technical expertise alongside large scale plant test capabilities. He was previously at Scottish Power where he was responsible for energy policy and regulation in the renewables business. He also has experience in Generation, Networks, Marketing and Corporate Communications. He sits on the Scottish Government's Energy Advisory Board, is a past Chair of trade associations Renewable UK and Scottish Renewables and has led a number of reports for Government, including the Cost Reduction Task Force for Offshore Wind in 2012. Andrew is a Chartered Electrical Engineer and has B.Eng and MBA qualifications from the University of Strathclyde.

## Prof Stephen Salter, Edinburgh University , UK

The importance of understanding flow impedance for the design of tidal stream plant.

Stephen Salter is Emeritus Professor of Engineering Design at Edinburgh University. After an apprenticeship in the aircraft industry as fitter and toolmaker on hovercraft and the Black Knight rocket he did a degree at Cambridge. He has worked on noise recording from birds eggs, astronomical instruments, robots for artificial intelligence, energy from wind, waves and tidal streams, desalination, voter-friendly traffic congestion, computer-controlled hydraulics, flood prevention, mine clearance, suppressing explosions, increasing the capacity of road bridges and now on the design of seagoing hardware to reverse global warming by making clouds whiter. Reports of his retirement are exaggerated.

# ABOUT KEYNOTE SPEAKERS

## Prof Lars Johanning, University of Exeter, UK

Optimization approaches for Offshore Renewable Energy Applications

Professor Johanning is a leading researcher with international recognition in the field of ocean energy and technology with a focus towards hydrodynamics and mooring systems. His research include activities such as loading and dynamic response of mono-towers in steep and breaking waves (GR/N04522/01) and hydrodynamic studies on station keeping principles for marine renewable devices within SuperGen UKCMER (GR/S26958/01), hydrodynamic analysis to support development of aquaculture systems (BB/M005208/1). I'm a Co-I on the Supergen-Marine (UKCMER) grant (EP/M014738/1), addressing mooring and reliability for MRE devices. Prof Johanning has led the development of the Falmouth Bay marine energy test site, which has seen the successful deployment of the Fred Olsen and Polygen wave energy devices.

He advised the ORE Catapult as member of the Research Advisory Group (RAG), provides expert advice within the Mooring Standards Committee to the IEC/TC114 and provided the technical lead in the development of the EU Ocean Energy Strategic Roadmap (2016) within the Ocean Energy Secretariat. He has extensive international experience, including over four years working on ORE technologies in China, holding a Visiting Scholar at Dalian University of Technology; and recently received funding to lead the development of resilient concept designs for floating offshore wind applications as part of the EPSRC/NSCF ORE UK-China call that includes Chinese project partners form Dalian University of Technology and Zheijang University.

## Dr Sasa Djokic, University of Edinburgh, UK

Assessing Operational Performance and Uncertainties in Offshore Wind Farm Power Outputs

Dr Sasa Djokic received Dipl.-Ing. and M. Sc. degrees in Electrical Engineering from the University of Nis, Nis, Serbia, and Ph. D. degree in the same area from the University of Manchester Institute of Science and Technology (UMIST), Manchester, United Kingdom. He is currently a Reader in Electrical Power Systems at the University of Edinburgh, Scotland, United Kingdom, teaching undergraduate and graduate (master and doctoral level) classes on Fundamentals of Electrical Engineering, Electrical Power Systems Engineering, Power Systems, Electrical Machines, Power Systems Economics, Network Integration of Renewable Generation and Power Quality. Dr Djokic has published more than 220 papers, of which several have received IEEE Best Paper and Best Poster awards. Over the past 25 years, Dr Djokic has performed research in the areas of theoretical electromagnetics, illuminating engineering, power quality, load and microgeneration modelling, off-shore and on-shore renewable energy resources and, most recently, system reliability and security analysis. He has contributed to the several national and international standards, technical reports and engineering recommendations, and is active in a number of CIGRE/CIRED, IEEE, IESNA, IEC/CISPR and other international Working Groups, Task Forces and Committees.

## About Glasgow

Glasgow has been named as one of the top 20 'Best of the World' destinations for 2016 by influential publication National Geographic Traveler, the city has also been voted the 'friendliest city in the world' in a Rough Guides poll and named a must visit destination by leading publications like the New York Times, The Guardian and Wanderlust! Earning its reputation as one of the world's greatest cities, you can expect a very warm welcome and when you add world-class architecture, a vibrant nightlife, breath taking scenery and out-standing shopping, you'll never want to leave! Further afield, ancient castles, picture-postcard distilleries, tranquil lochs, outstanding golf courses and miles of unspoilt coastline are all just a short journey from the city centre - incredibly, you can get to Loch Lomond, gateway to the Scottish Highlands in only 30 minutes. The capital of Scotland, Edinburgh is only 50 minutes far by train.

## Getting Here

### Airport Connections

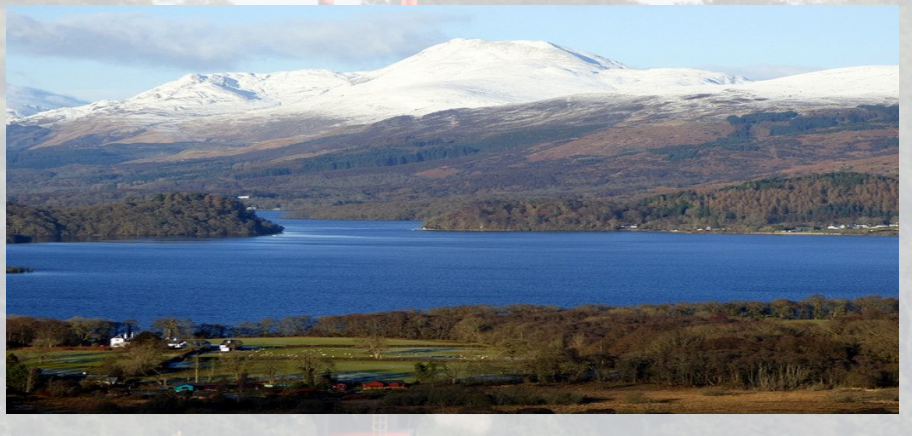
Glasgow is well connected globally by Glasgow International Airport through Emirates, KLM, Air France, Easyjet, Ryanair and many more. The airport is currently linked to Glasgow City Centre by Glasgow Shuttle bus service 500. This is run by First Glasgow under contract to Glasgow Airport. The service runs 24 hours a day, direct via the M8 motorway.

### Train Connections

Fast trains run into the centre of Glasgow terminating at Glasgow Central. The train service from London, Manchester, Newcastle terminate at Glasgow Central or at Glasgow Queens Street with connections through Edinburgh Waverley.

George Square

Glasgow Science Centre



Loch Lomond

# CONFERENCE VENUE

**JURY'S INN HOTEL**

**80 JAMAICA ST, GLASGOW**

**G1 4QG**

Situated on Jamaica Street, the four star hotel in Glasgow is within a ten minute walk of three major stations- Glasgow Central, Queen Street and Argyle Street making it the ideal hotel for transport links within the city centre. With an easy three minute train ride (or 20 minute walk) to the **Scottish Exhibition and Conference Centre** and **The Hydro** Entertainment Arena, Jurys Inn Glasgow is perfectly placed for both business and pleasure guests. Our four star Glasgow hotel is also a stone's throw away from a plethora of restaurants and bars, a three minute walk from **St Enoch shopping centre** and just around the corner from **Alston Bar & Beef**, the best steak and gin that Glasgow has to offer located beneath Glasgow's Central Station. Steeped in heritage, this city also has plenty of beautiful old buildings and monuments to explore, from breath-taking **Glasgow Cathedral** to George Square, offering guests a taste of Glasgow's rich history.

# CONFERENCE DINNER VENUE

**29th August 2019, 19:00**

**JURY'S INN HOTEL**

**80 JAMAICA ST, GLASGOW**

**G1 4QG**

# Sponsorship & Exhibition Space

## Sponsorship

Cost £1500 + VAT

### Package Includes:

- 2 Free Delegate Registration
- Company Logo in the Conference Programme
- Company Logo in the Book of Abstracts
- Company advert in the Book of Abstract (A4 Size)
- Advert in the Conference Proceedings

## Exhibition

Cost £1200 + VAT

### Package Includes:

- 1 Free Delegate Registration
- 1 Display table (1800 x 1200 mm) in Breakout Area
- Display material: Published material, Structural component
- Display Banners

## Sponsorship Package + Exhibition Package

Cost **£2100 + VAT**

- 2 Free Delegate Registrations
- 1 Display Table (1800 x 1200 mm) in Breakout Area
- Display Material: Published Material, Structural Component
- Display Banners
- Company Logo in the Conference Programme
- Company Logo & Advert in the Book of Abstracts (A4 Size)
- Advert in the Conference Proceedings

**Contact E: core@asranet.co.uk T: +44 (0)141 275 4801**

ASRANet

ASRANet Ltd was formed in February 2006. It Originated as a spin out company of the Universities of Glasgow and Strathclyde and now it operates as an independent company.

It deals mainly with maritime and civil engineering structures which includes ships, offshore structures, subsea structures and renewable energy structures.

ASRANet specialises in courses and conferences related to maritime engineering and civil engineering structures.

We also offer in-house training throughout the UK and abroad.

See our course and conference details are www.asranet.co.uk

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